

What is claimed is:

1. A radar beam scanning method for scanning a radar beam for tracing a moving target, comprising the steps of:

5 radiating a radar beam scanned along a second direction;

measuring an intensity distribution along said second direction of said radar beam reflected by said moving target;

10 estimating an angle along said second direction of said moving target;

setting up said radar beam to the estimated angle;

scanning along a first direction perpendicular to said second direction.

15 2. An on-vehicle radar apparatus for scanning a radar beam for tracing a moving target, comprising:

intensity distribution acquiring means for acquiring an intensity distribution along a second direction of said radar beam reflected by said moving target;

20 tilt angle setting-up means for setting up a tilt angle of said moving target on the basis of said intensity distribution; and

radar operating means for scanning along a first direction perpendicular to said second direction and for at least detecting distances between one or more moving target and said on-vehicle radar apparatus.

3. The on-vehicle radar apparatus according to claim 2, which further comprises a second antenna for scanning

along a second direction including a travelling wave excitation antenna for transmitting said radar beam toward said moving target,

wherein said tilt angle setting-up means changes  
5 frequency of said radar beam.

4. The on-vehicle radar apparatus according to claim 2, which further comprises a first antenna for scanning along a first direction including a plurality of travelling wave excitation antennas each of which tilt angle along  
10 said second direction is different with each other for receiving said radar beam reflected by said moving target,

wherein said tilt angle setting up means selects one or more travelling wave excitation antennas of which tilt angle are within a prescribed range around said tilt angle  
15 of said moving target.

5. The on-vehicle radar apparatus according to claim 4, wherein said travelling wave excitation antennas are constructed by a plurality of antenna elements along said second direction,

20 wherein each of said tilt angles of said travelling wave excitation antennas is decided by changing distances between said antenna elements per travelling wave excitation antenna.

6. The on-vehicle radar apparatus according to claim  
25 4, which further comprises target angle shifting means for shifting along said second direction said tilt angles of said travelling wave excitation antennas.

7. The on-vehicle radar apparatus according to claim

4, wherein said intensity distribution acquiring means acquires said intensity distribution by using a first antenna.

8. The on-vehicle radar apparatus according to claim  
5 2, wherein said tilt angle setting up means sets up a target angle for a most distant moving target on the basis of said distances detected by said radar operating means.

9. The on-vehicle radar apparatus according to claim  
2, which further comprises relative speed detecting means  
10 for detecting relative speeds between said on-vehicle radar apparatus and moving & not-moving targets,

wherein said tilt angle set-up means sets up a tilt angle only for one of said moving target.

10. The on-vehicle radar apparatus according to  
15 claim 2, wherein said first direction is the horizontal direction and said second direction is the vertical direction.

11. The on-vehicle radar apparatus according to claim 2, which further comprises:

angle range calculating means for calculating an angle  
20 range along said second direction perpendicular to a first direction within which said moving target exists; and

size estimating means for estimating a size of said moving target by using said angle range calculating means and radar operating means.

25 12. The on-vehicle radar apparatus according to claim 11, wherein said size estimating means estimates a height of said moving target by using said angle range calculating means and radar operating means.

13. The on-vehicle radar apparatus according to claim 11, wherein:

said radar operating means calculates a distance between said moving target and on-vehicle radar apparatus and an angle range along said first direction;  
5 and

said size estimating means estimates a projected area of said moving target on the basis of said distance, angle range along said first and second directions.

10 14. The on-vehicle radar apparatus according to claim 2, wherein said radar operating means scans along a first direction perpendicular to said second direction said radar beam of frequency-modulated continuous wave and generates information about said moving target.

15 15. A computer program for scanning a radar beam for tracing a moving target, comprising the subroutines of:

radiating a radar beam scanned along a second direction;

20 measuring an intensity distribution along said second direction of said radar beam reflected by said moving target;

estimating an angle along said second direction of said moving target;

25 setting up said radar beam to the estimated angle;

scanning along a first direction perpendicular to said second direction.